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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/917,751	07/31/2001	Wen-Yih Liao	LIAO3030/EM/7087	2784
23364	7590	03/29/2004	EXAMINER	
BACON & THOMAS, PLLC 625 SLATERS LANE FOURTH FLOOR ALEXANDRIA, VA 22314			ANGEBRANNDT, MARTIN J	
			ART UNIT	PAPER NUMBER
			1756	

DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/917,751

Applicant(s)

LIAO ET AL.

Examiner

Martin J Angebranndt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 30-49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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1. The response from the applicant has been read and given careful consideration.

Responses to the arguments offered by the applicant are presented after the first rejection to which they are directed. The rejections of the previous office action, not repeated below are withdrawn due to the arguments and amendment of the claims. The applicant has changed the statutory class of invention from that of a dye to a data storage medium. This is not a matter of right for the applicant, but may be permitted by the PTO. The examiner permits the shift in claimed invention and notes that it is likely more fruitful than the previous class of claims.(see MPEP 819.01)

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 30-49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 30 and 40, “a **fix** membered carbon containing aromatic ring” is unclear , perhaps “fix” should read – six - -. (line 5)

In claim 33, should recite that the claims is to “The data Storage media of claim 31, wherein the reflection layer has a thickness of” The preamble only describes the reflection layer, which has not been introduced in claim 30, but is introduced in claim 31. (lacks antecedent basis)

In claim 38, should recite that the claims is to “The data Storage media of claim 36, wherein the reflection layer has a thickness of” The preamble only describes the reflection

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layer, which has not been introduced in claim 35, but is introduced in claim 36. (lacks antecedent basis)

In claim 43, should recite that the claims is to “The data Storage media of claim 41, wherein the reflection layer has a thickness of” The preamble only describes the reflection layer, which has not been introduced in claim 40, but is introduced in claim 41. (lacks antecedent basis)

In claim 48, should recite that the claims is to “The data Storage media of claim 46, wherein the reflection layer has a thickness of” The preamble only describes the reflection layer, which has not been introduced in claim 45, but is introduced in claim 46. (lacks antecedent basis)

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 30-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liao et al. ‘087 combined with Cho et al. JP 08-108631 and Sato et al. ‘839.

Liao et al. ‘087 teach the use of mixtures of pentamethine and trimethine indolene dyes which have 4-methoxycarbonyl benzyl moieties bound to the nitrogen on the indole ring. Figure 1 shows the absorbance of the trimethine dye to be at 556 nm and figure 2 shows the pentamethine dye to have a maximum absorbance at 648 nm. The recording disk structure is a polycarbonate substrate coated with a solution of the two dyes, overcoated with a silver or gold 100 – 250 nm reflective layer and a 1 micron protective layer. (5/39-60). The total content of the

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trimethine dye in the coating solution is 0.5 to 5% (claim 7), preferably 1.3 to 1.7% (claim 8).

The amount of the pentamethine dye to the trimethine dye is 1 to 10 % (claim 5), preferably 3.5 to 5% (claim 6). The various coating solvents are disclosed in claims 9-15 and include alcohols, ethers, ketones, tetrafluoropropanol, chloroform, dichloromethane and dimethylformamide.

Useful counterions are disclosed including acid anions, halogens, alkylsulfonate arylsulfonate and perchlorates. (3/17-28). The use of 1.5 g of the trimethine dye and 0.075g of the pentamethine dyes in 100g of a TFP solution is disclosed. The pentamethine dye is present as 5% of the trimethine dye. These dyes are described as having improved solubility and higher thermal stability vs. other similar cyanine dyes. (2/2-4).

Cho et al. JP 08-108631 (Japanese equivalent of US- 5579150, machine translation attached) teaches cyanine dyes TCNQ single salts/complexes as shown in formula I, which results in a cyanine dyes based recording medium with improved recording sensibility (sensitivity) [0007-0009]. The reflectivity is also improved due to the use of the complex [0018]. The solubility, and sensitivity are increased due to the use of the TCNQ complexed cyanine dye.

Sato et al. '839 teaches that unsymmetrical indoleneic cyanine dyes have higher solubility and stability. (abstract and 2/10-15). Indoleneic and benzoindolenic dyes are described throughout. The addition of stabilizers is disclosed. (21/49 and 21/57-23/35). The addition of various materials to the recording layer is disclosed including polymeric binders, the polymeric binder is held to act as an adhesive/glue. The N- substituents may be substituted or alkyl moieties. The recording layer may be 10-500 nm (23/36-41). Useful protective layers may

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be 0.2 to 10 microns (24/9-25). Materials for providing improved reflectance include Zn, Cu, Ni, Cr, Ge, Se, Al, Ag. (24/20-24).

It would have been obvious to add TCNQ counterions as disclosed by Cho et al. JP 08-108631 to the mixtures of pentamethine and trimethine indolene cyanine dyes containing optical recording media of Liao et al. '087 with a reasonable expectation of gaining in reflectivity, sensitivity and lightfastness taught by Morishima et al., A new type of light stabilizer for dye layers ...", Jpn. J. Appl. Phys., Vol. 38(1,3b) pp. 1634-1637 (03/1999) and/or it would have been obvious to use the mixtures of pentamethine and trimethine indolene cyanine dyes of Liao et al. '087 in place of those used in the examples of Cho et al. JP 08-108631 with a reasonable expectation of realizing the gains in solubility and thermal stability taught by Liao et al. '087 and to modify the trimethine cyanine dyes of the mixture of pentamethine and trimethine indolene cyanine dyes in the optical recording medium resulting from the combination of Liao et al. '087 and Cho et al. JP 08-108631 by modifying one of the N substituents on the trimethine to be an unsubstituted alkyl, such as butyl, rather than an alkyl substituted by a methyl ester of 4- benzoic acid with a reasonable expectation of increasing the solubility of that dye mixture over the case where both of the pentamethine and trimethine indolene cyanine dyes have the same substituents.

The applicant points to the three requirements of USC 103, the motivation to combine, the suggestion of all the limitations, and the reasonable expectation of success. The Liao reference teaches mixtures of pentamethine and trimethine indolene cyanine dyes bearing methyl ester of 4- benzoic acid substituents in the appropriate ratios forming a recording layer, by spin coating, a 1000 angstrom (100 nm) gold reflective layer and a protective layer. The use of the methyl ester of 4- benzoic acid substituents is disclosed as resulting in gains in solubility and

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thermal stability. Therefore the use of the dye mixtures is taught as is the value of the methyl ester of 4- benzoic acid substituents. Cho et al. JP 08-108631 establishes that the use of TCNQ counterions with cyanine dyes results in gains in reflectivity, solubility, lightfastness and sensitivity, which provides motivation/benefits and teaches the use of the TCNQ counterions with cyanine dyes. The Sato et al. reference teaches that changing one of the N-substituents to make dyes less structurally similar is old (1988) and the resulting increase in solubility well known in the art. The specific use of either substituted or unsubstituted alkyl groups as the N- substituents is also disclosed. Therefore the motivation/benefit of change one of the N- substituents is old and well known in the art. These references all concern cyanine dyes based optical recording media and therefore the reasonable expectation of success of forming useful cyanine dye based optical recording media is reasonably assured. The motivation provided by the references undercuts the (impermissible) hindsight argument of the applicant.

The applicant's representative has included data, which would have to be submitted in proper declaration form to have its full impact (pages 11-12 of the response). The applicant asserts that the claimed invention has a higher solubility than the compounds of Morishima et al.. This result seems to be recognized in the art as is its underlying cause. The dyes of Liao et al. '087 are described as having improved solubility and higher thermal stability vs. other similar cyanine dyes. (2/2-4) and the use of dissimilar N- substituents is also recognized as resulting in increased solubility (Sato et al. abstract and 2/10-15). Therefore the benefit argued appears to be recognized in the art. There may be an issue of the degree of increased solubility, but the data of the applicant is not of sufficient detail to address this.

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6. Claims 30-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liao et al. '087 combined with Cho et al. JP 08-108631 and Sato et al. '839, further in view of Ishida et al. '094.

Ishida et al. '094 teach the dyes of formulae I mixed with TCNQ compounds A1 or A2. The use of recording layer having thicknesses of 50-300 nm is disclosed. (21/32-36). The use of various metals, such as the preferred Au, Ag, Al, Cu, Cr and alloys thereof in thicknesses of 50-300 nm is disclosed. (21/40-59). The use of singlet oxygen quenchers as dopants is disclosed as good, but less than when they are used as the counterions. (1/46-2/12). The use of cyanine dye cations and TCNQ anions is disclosed as working best. (2/27-35,

In addition to the basis provided above, the examiner holds that it would have been obvious to modify the optical recording medium resulting from the combination of Liao et al. '087, Cho et al. JP 08-108631 and Sato et al. '839 by using other thicknesses for the reflective and/or recording layers and/or other reflective layer materials known in the optical recording media art to useful with cyanine dyes based optical recording media, such as those taught by Ishida et al. '094 with a reasonable expectation of forming a useful optical recording medium.

7 Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

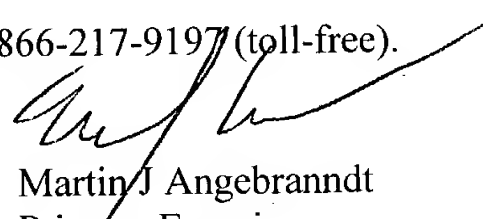
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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J Angebranndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Martin J Angebranndt
Primary Examiner
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03/23/2004